

# **ENVIRO TECH**

## **CHEMICAL SERVICES, INC.**

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### **BCDMH Chemistry, Facts and Myths** **...and 100 gram tablets, too.**

BCDMH has been on the market for almost 40 years and has proven to be an excellent microbiocide in countless industrial and commercial water applications. It also has been accepted as one of the more popular spa and hot tub microbiocides.

BCDMH is an acronym for 1-bromo-3-chloro-5,5-dimethylhydantoin. The bromine atom is loosely bound to the N1 nitrogen atom of the dimethylhydantoin (DMH) and the chlorine is very tightly bound to the N3 nitrogen of DMH. Upon exposure to water the BCDMH disassociates into hypobromous acid (HOBr) and chloro-DMH. The hypobromous acid is a very potent broad spectrum antimicrobial that is quite effective at pH levels up to 9.0. The chloro-DMH does not contribute any appreciable antimicrobial efficacy.

In the case of industrial recirculating water, most pH ranges are 8-8.8 where the bromine moiety is very amenable and effective in these pH ranges. The chlorine moiety remains tightly bound to the nitrogen-based DMH and is unavailable for any notable antimicrobial activity, but can act as a weak oxidant for background chemical demand.

Typically, most conventional BCDMH products are about 64% available bromine and 28% available chlorine, e.g. from Biolab, Clearon, and Enviro Tech's BCDMH TABS. However, other BCDMH products on the market (such as Lonza's Dantobrom) are distinctly lower in bromine to chlorine ratios than conventional BCDMH. For example, a typical Dantobrom contains 39% available bromine and 44% available chlorine, rather than the typical 64-28 ratio described above. The higher chlorine to bromine ratio (or conversely said, a lower bromine to chlorine ratio) is due to the introduction and blending of DCEMH (dichloro-ethylmethylhydantoin) into the "briquette" tablet formulation. Because of their higher chlorine content, these blended DCEMH-BCDMH products are much more soluble and faster dissolving than conventional BCDMH.

At typical pH ranges (above 7.5) encountered in industrial water treatment, the only value-added component of BCDMH is directly related to the bromine content of the BCDMH, due to bromine's pH tolerance and efficacy at elevated pH ranges. Contrary to some opinions, the chlorine-based portion of the molecule (chloro-DMH) is unavailable to regenerate the bromide ion back into hypobromous acid regardless of the type of BCDMH that is initially utilized. The extremely low oxidizing capacity of chloro-DMH requires a concentration of 100-200 times greater than the available bromide ion in order to accomplish any "regeneration" of bromide into hypobromous acid under normal recycled water conditions. Therefore, this "recycling" of bromide ion into hypobromous acid is a marketing myth, and is not possible within the laws chemistry and nature.

Faster dissolution of a tablet leads to higher consumption (dissolution) rates, which also equates to more service. Additionally, excessive dissolution rates also result in more intense concentration “spikes” in terms of residual ppm, which in turn drops off quickly as the tablets erode. This cycle of spike and drop creates very steep ‘S’ shaped concentration graphs, with the net results being higher average total bromine ppm must be maintained to account for significant periods of underfeed.

In 2007 Enviro Tech is introducing the 100 gram tablet. These tablets are 5 times larger in size than the typical 20 gram tablets. The dissolution/erosion rate is 2.5 times slower than “average” BCDMH and perhaps 3.5-4 times slower than Dantobrom. This net effect is reduced spikes and drops in overall bromine residuals between periods of tablet refilling (the fill and feed cycle).

The service technician can expect to service the 100 gram tablet feeder 2-3 times less often and one can expect much more consistent and stable BCDMH residuals throughout and during the fill and feed cycles. Enviro Tech’s 100 gm tablet is the only one of its kind on the market in the United States, and is available only from Enviro Tech. They come packed in 50 lb pails. Each pail comes with 3 ea. (16.7 lb.) plastic pouches, which makes transferring into tablet feeders easy and convenient. Dusting and exposure to BCDMH will be reduced dramatically.